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# Setting up OpenGL

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1. You should discuss with a demonstration the following issues
  - The installation of a C/C++ compiler with the required SDKs
  - OpenGL graphics library
  - OpenGL three parts: gl, glu, and glut
  - Setting up the OpenGL on your machine
  - Compile and run the program below (The program is just given as a verification tool for testing the installation, we did not study yet the contents of the program)

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1
2 #include "stdafx.h"
3 #include <GL/glut.h>
4 void init(void)
5 {
6     GLfloat mat_specular[] = { 1.0, 1.0, 1.0, 1.0 };
7     GLfloat mat_shininess[] = { 50.0 };
8     GLfloat light_position[] = { 1.0, 1.0, 1.0, 0.0 };
9     glClearColor (0.0, 0.0, 0.0, 0.0);
10    glShadeModel (GL_SMOOTH);
11    glMaterialfv(GL_FRONT, GL_SPECULAR, mat_specular);
12    glMaterialfv(GL_FRONT, GL_SHININESS, mat_shininess);
13    glLightfv(GL_LIGHT0, GL_POSITION, light_position);
14    glEnable(GL_LIGHTING);
15    glEnable(GL_LIGHT0);
16    glEnable(GL_DEPTH_TEST);
17 }
18 void display(void)
19 {
20     glClear (GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT);
21     glutSolidSphere (1.0, 20, 16);
22     glFlush ();
23 }
24 void reshape (int w, int h)
25 {
26     glViewport (0, 0, (GLsizei) w, (GLsizei) h);
27     glMatrixMode (GL_PROJECTION);
28     glLoadIdentity();
29     if (w <= h)
30         glOrtho (-1.5, 1.5, -1.5*(GLfloat)h/(GLfloat)w,
31                 1.5*(GLfloat)h/(GLfloat)w, -10.0, 10.0);
32     else
33         glOrtho (-1.5*(GLfloat)w/(GLfloat)h,
34                 1.5*(GLfloat)w/(GLfloat)h, -1.5, 1.5, -10.0, 10.0);
35     glMatrixMode(GL_MODELVIEW);
36     glLoadIdentity();
37 }
38 int main(int argc, char** argv)
39 {
40     glutInit(&argc, argv);
41     glutInitDisplayMode (GLUT_SINGLE | GLUT_RGB | GLUT_DEPTH);
42     glutInitWindowSize (500, 500);
43     glutInitWindowPosition (100, 100);
44     glutCreateWindow (argv[0]);
45     init ();
46     glutDisplayFunc(display);
47     glutReshapeFunc(reshape);
48     glutMainLoop();
49     return 0;
50 }
```

2. What is *Computer Graphics* and how it's different from *Image Processing*?
3. Mention some application areas of computer graphics

4. Explain why images are better displayed than text on CRT monitors.
5. We can generally classify graphics utilities and libraries in two main types:
  - Two dimensional drawing utilities and libraries
  - Three dimensions utilities and libraries that utilizing scene/viewer/projection modelExplain the main differences between the two types in stressing the role of the graphics creator when using each of them